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**Comment on RM-11831,  
by Hans-Peter Helfert, DL6MAA,  
c/o Spezielle Communications Systeme GmbH & Co. KG, Germany**

Dear Sirs and Madams,

Thank you for the opportunity to comment on RM-11831.

As a representative of industry, I have an interest in the fact that US amateur radio (AR) law allows commercially manufactured devices in the AR service. I am concerned this proposed rulemaking will reverse this.

We understand the desire for general monitoring of digital modes in the AR service, but we reject the demand for "open source" software. The term open-source would ultimately lead to commercially manufactured radio modems becoming illegal to use. I strongly suspect such wording will also have side-effects as outlined below.

But first I would like to introduce myself: I am head of the software development department at Special Communications Systems (SCS), an HF modem manufacturer in Germany. I graduated from a scientific university education at the Technical University of Munich and have held a German AR license since 1981, my AR call sign is DL6MAA. I have been involved in the development and optimization of HF communications systems for more than 30 years. In addition, I am an enthusiastic telegraphist (CW), and a member of many CW high-speed clubs (e.g. HSC, VHSC), so also know the AR scene outside the digital segment very well.

In 1990 my company SCS released the PACTOR mode (PACTOR 1), a protocol for reliable

digital data transmission via shortwave. The ongoing development of the protocol and the underlying modem hardware has finally led to PACTOR 4 (P4). Through its almost 30 years of development and evolution, PACTOR has complied with US law at all times. P4 utilizes advanced algorithms for HF channel equalization, channel coding and data compression. Encryption is expressly not used, under present US law, so that our comprehensive monitoring mode allows full transparency of the PACTOR traffic, also for third parties. The monitoring mode is available as a standard tool in every PACTOR modem.

The modem(s) onboard data compression (Huffman, Pseudo Markov Compression) is packet-wise compression. Using this *onboard* compression *does not* hinder decoding by a third-party listener in any way. By using the PACTOR modes of the modem, you cannot obscure transmitted data. *Outboard* processing from a PC (e.g. ZIP, LZH compression, JPEG) or encrypting contents by application software before sending it to the modem could affect third party listeners ability to reassemble the payload. PC compression techniques (ZIP, LZH compression, JPEG, etc.) have been in common use for decades and contribute to greatly reduced bandwidth, whether it be fiber or wire internet from email to Netflix or wireless radio connections. Though not specifically discussed in RM-11831, the implication is to eliminate these techniques within AR, greatly affecting efficient use of the shortwave spectrum.

We understand the demand for a free PACTOR monitoring tool for everyone, independent of the purchase of a modem or expensive monitoring software. A requirement for a free monitoring tool, to my knowledge, cannot be found in any AR law in the world, so this proposal is a novelty.

Nevertheless, SCS is willing to develop and provide a free PACTOR monitoring tool as a contribution to “mutual understanding” in the spirit of AR. This would be a software solution under the operating systems Linux and / or Windows. The tool would not require any special hardware. However, such a development would require considerable effort for SCS, as our modems are powered by specialized signal processors. Porting the software to common Intel and ARM processors will be correspondingly expensive. Nonetheless, we are willing to provide such a comprehensive, free monitoring tool. It would integrate with the Volunteer Monitor Program now being organized by the ARRL.

The tool cannot be "open source", leaving bare critical software components. SCS developed complex channel equalizers and very fast decoders for the applied error correction algorithms. These methods will be included in a monitoring tool in order to achieve success. With “open source” these algorithms would be completely unprotected against robbery of intellectual property and illegal adoption into third-party software.

Additionally, "open source" would widely ban the use of any commercial modem technology and many amateur-produced advanced protocols. We believe that this would be a major and tragic setback for AR. Just as only a few radio amateurs are still willing and able to build their own radios today, only a handful are capable of developing on their own HF modems that

come close to the physical boundaries of performance (e.g. Shannon Limit). On the other hand, good HF modems are available from the industry, offering outstanding utilization of signal energy and bandwidth with very high reliability.

We are convinced that a healthy commercial economy surrounding AR today is essential for AR. As fewer and fewer amateurs make their own equipment and write their own software, the AR service relies almost entirely today on good commercial equipment. The “open source” requirement is detrimental to a healthy AR economy and thus the entire AR community, and is not required to satisfy a desire to monitor transmission payloads for self-policing. If “open source” is adopted, commercially manufactured radios and other products will be banned, especially when using digital voice compression techniques (e.g. D-Star, vocoders like AMBE) or using the internet as a bridge (e.g. WIRES). Even software defined radios in general could be a transparency risk because, for example, hidden data could be embedded in an SSB voice signal. In all these cases a special piece of hardware with proprietary firmware or software is required to extract the payload contained in the radio signal. Requiring these products to use open-source firmware or software is an unintended side-effect with devastating outcomes for the AR community.

If allowed, digitization will continue to evolve and advance in AR. If an open-source restriction is made, it would have a significant negative impact on the further development of AR. Not all improvements will take place as open-source development. The development of even better digital transmission technologies - which exploit the higher computing power of the current generations of digital processors for even higher modem efficiency - is now extremely complex requiring significant development.

PACTOR monitoring mode is available in all our modems. Additionally, Winlink offers online access to messages sent on AR frequencies. We have been seeing for many years a harsh opposition to PACTOR in the US, and a core group trying to discredit PACTOR. It is unique in the US. This aversion culminates in the demand for "open source" in RM-11831 - and, under the guise of a legitimate and reasonable demand (monitoring), indirectly bans commercial radio modems in the US. No manufacturer will enter the US AR market willing to fully disclose his intellectual property or to so encourage piracy of his intellectual property.

This ban would certainly have lasting consequences for the further development of a good digital infrastructure in the US AR service, and would make the US an island in the world, inoperable with the rest of the world's high-speed modes on AR.

AR promotes technical development. This is a cornerstone of the AR community since its inception. Additionally, governments usually act to protect the intellectual property of economic contributors, not force them to give IP away.

Over the last 20 years, +20,000 SCS modems have been sold into the US AR market. Adoption of RM-11831 leaning would disenfranchise thousands of American radio amateurs

and have chilling effect to the voluntary emergency radio networks (Emcomm), the Military Auxiliary Radio System (MARS) and SHARES. These emergency operators are amateur radio licensees. The Winlink system would also be significantly affected and hindered in its worldwide operation by a ban in the US. If these services were to remove B2F compression from their implementation, messages will take 2-10 times longer to transfer, destroying spectral usage efficiency and taking AR digital communications back 20+ years. Adoption of RM-11831 will torpedo the decades-long development of digital infrastructure on shortwave in the US (e.g. the Emcomm and Winlink systems mentioned above). Digital AR communications has saved property and many lives. That will be unlikely going forward if this proposal is adopted.

We therefore expressly request the removal of the term "open source" without substitution from the legal text. In addition, a longer transitional period should allow the fulfillment of the new requirements (e.g. development of a free monitoring software).

We propose the following be adopted as requirements for a (new) digital method:

1. Description of its fundamental characteristics (ITU emission designator)
2. Description of the channel and source coding
3. Availability of an easily accessible monitoring mode

We see this as more than adequate for the required "transparency in the AR service". Further, Winlink offers its message database online to world governments and amateur self-policing authorities. In all other countries worldwide, transparency of digital transmission modes in AR is handled even more liberally: the description of the modulation characteristics (bandwidth, ITU emission designator) as well as the provision of a monitoring tool for the authority itself is sufficient to fulfill the legal requirements. Offering a proprietary decoder for monitoring is sufficient to meet the demands for self-policing of the Amateur community, world-wide, and is consistent with ITU rules.

If RM-11831 is not rejected entirely and were to be adopted as a part of a new law, one additional paragraph should be entered, clarifying that the new conditions apply to such modes which are newly-developed and published from the date the new rule comes into force, but not for modes that have been in common and legal use for years. Under the "customary law", the old protocols should continue to be subject to the old conditions.

As a final remark I want to add that RM-11831 has another severe weakness: Eliminating paragraph 97.221(c) will force all automatic digital stations, regardless of signal bandwidth, into the narrow sub-bands in the USA. Though opponents claim this will reduce amateur-amateur interference, it will aggravate the problems of unintended collisions and mutual interference within the inadequate sub-bands while other portions go underutilized. The ITU rules and the rules of other countries do not limit emissions like this by content to narrow sub-bands. Furthermore, the potential for interference is not alleviated by any action of the USA

alone. When the US rules do not well-conform to the rules of its neighbors, confusion and interference is increased. Adjusting US amateur allocation rules to better align with ITU recommendations could improve the situation, not the biased patch to allegedly dysfunctional US rules proposed in RM-11831.

Respectfully, and with best regards from Germany,



Hans-Peter Helfert

**SCS** GmbH & Co. KG